



The VV&A Documentation Tool: Automating the VV&A Process

SPAWAR Systems Center- Charleston
Code 324



Milestones



- **November, 2001** Began development of Turbo Tool Beta
- **December, 2001** First review of the initial prototype
- **January, 2002** Began build and review process
- **April, 2002** Release of Turbo Tool Beta
- **September, 2002** Began development of the VV&A Doc Tool
- **December, 2002** Demonstration at I/ITSEC 2002
- **June, 2003** Released Version 1.0 VV&A Doc Tool
- **February, 2004** Released CD-Rom of v.2.0
- **March, 2004** Released Web-Based Doc Tool



Automation of the Handbook



- The handbook is the tool used to ensure the Department of the Navy has all the information needed to implement efficient and effective VV&A processes.
- The VV&A Doc Tool is used to assist users to ensure that the guidelines of the handbook are being met.



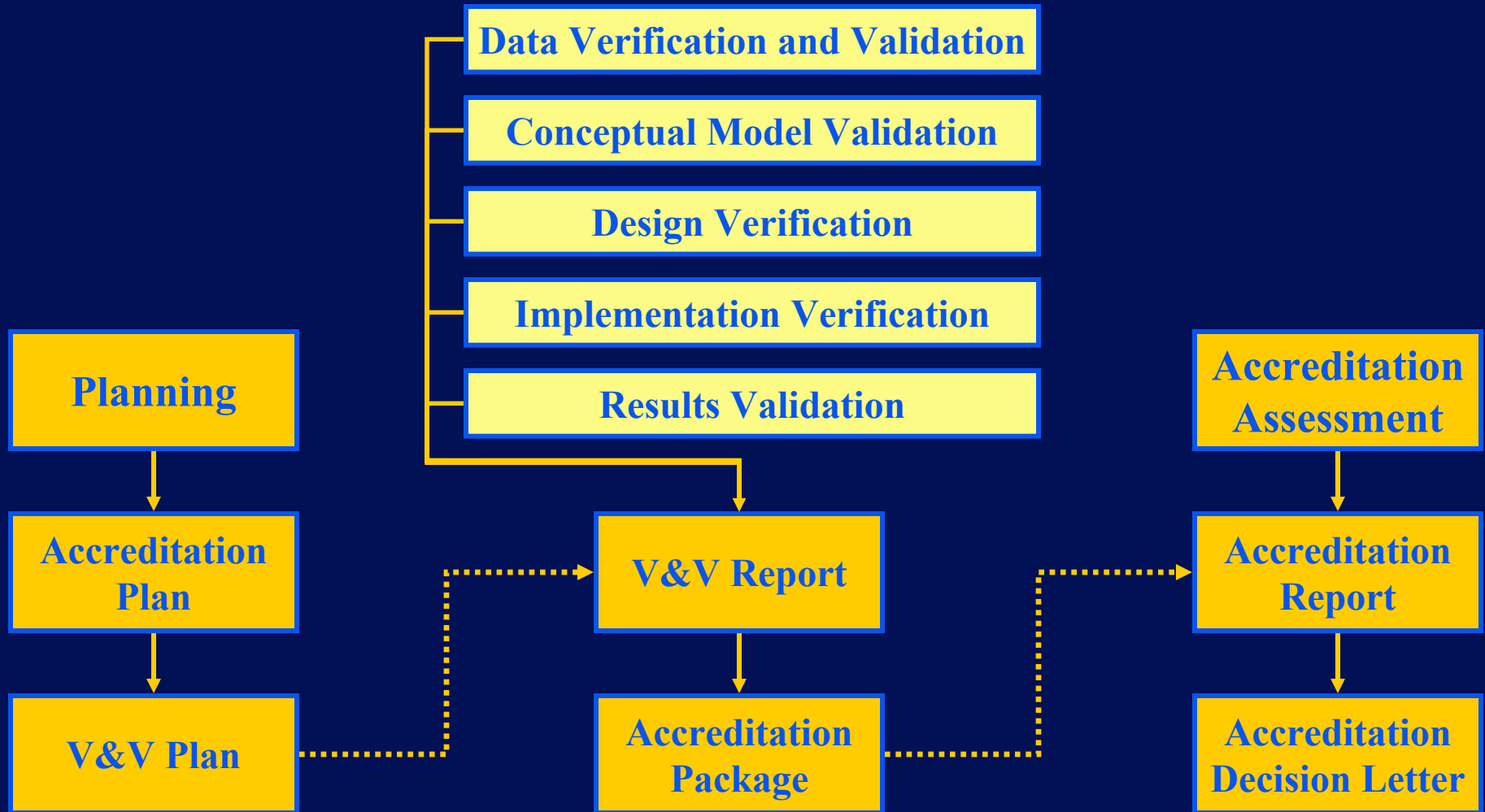
Need for the VDT



- Hesitation to conduct VV&A continues despite a DON mandate and implementation guides. Something further is still needed to activate and facilitate the VV&A documentation process.

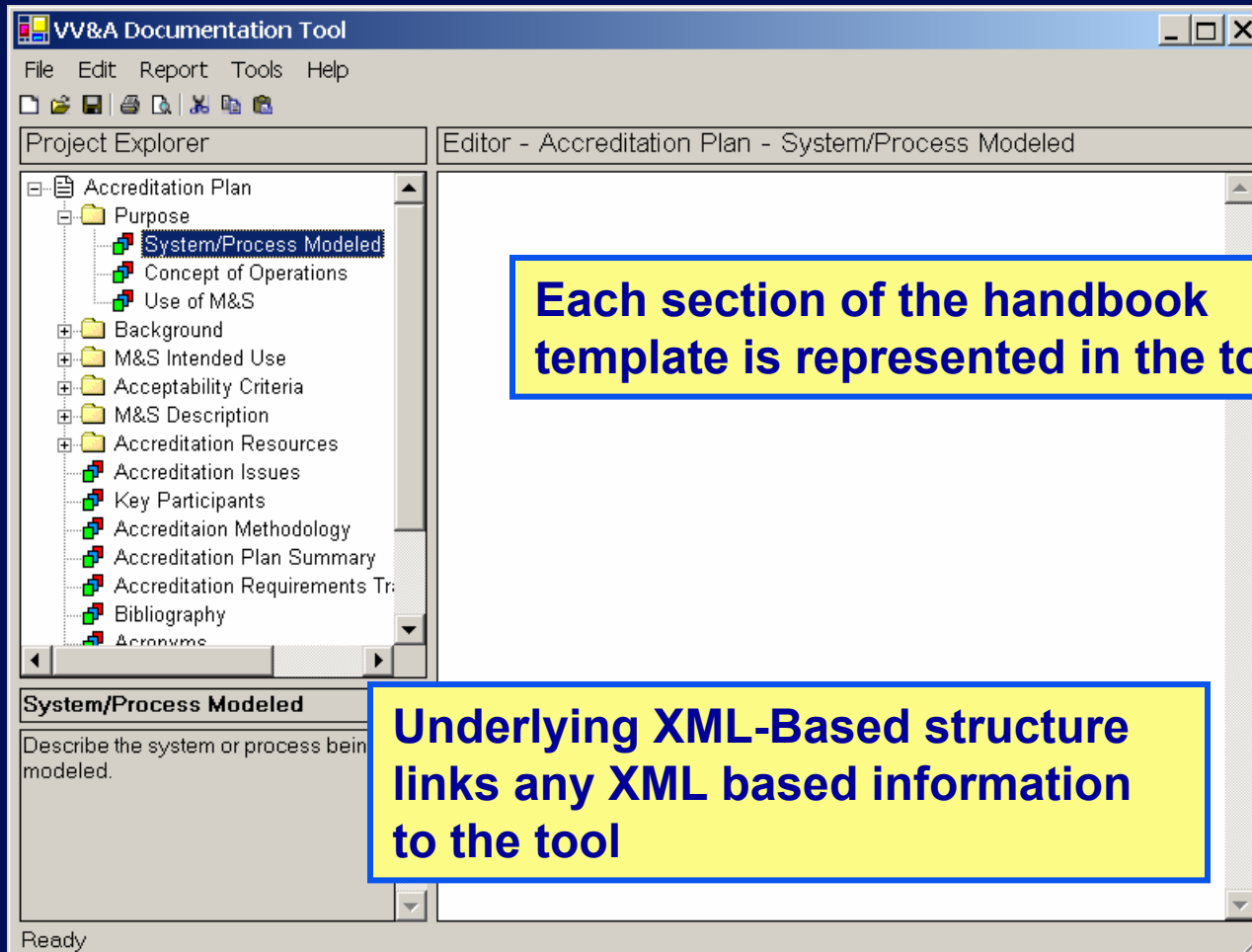


Products of the VV&A Process



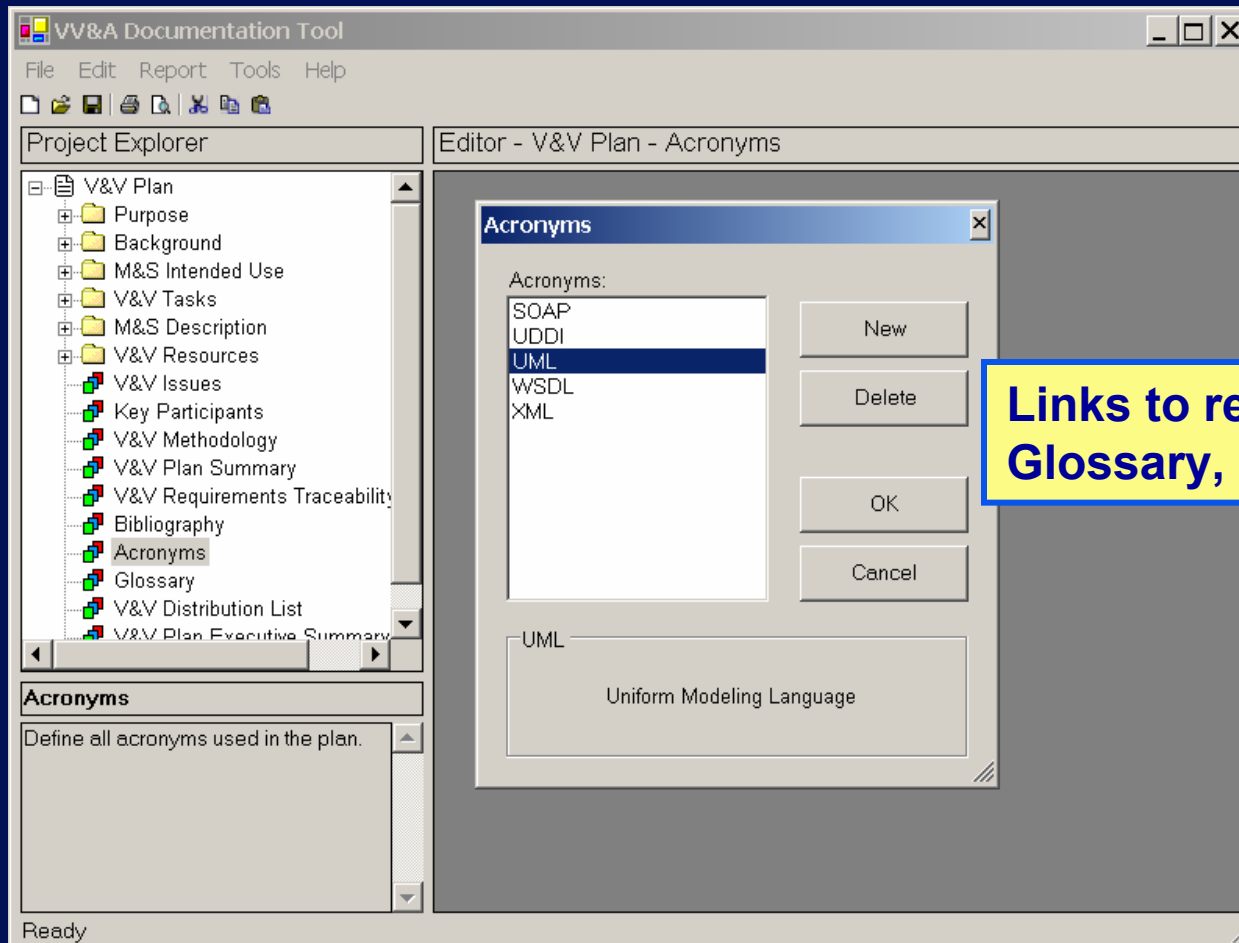


Preparing the Documentation





Tools



Links to repository of Acronyms, Glossary, and Bibliography



VVML



- Proposed VVML ("Validation and Verification Markup Language")
- The benefits of VVML range from high-level compatibility with web-based technologies within an extensible framework which will enable a new generation of M&S applications to emerge, develop and inter operate.

¹ Developing an XML Architecture for VV&A; The Development of the Verification, Validation Mark-up Language (VVML), 04S-SIW-027, 2004 Spring Simulation Interoperability Workshop, Washington, D.C., April 2004



VVML: The Need



- The impetus to simplify the documentation process with an intuitive format is the foundation for the creation of VV&A Markup Language (VVML).
- VVML provides a framework for creating both basic unidirectional links and more complex linking structures allowing documents to assert linking relationships among more than two sources.



Reports Generation



NAVMSMO VV&A Documentation Tool v. 2.0.0.b

File Edit Format **Report** Windows

Project Explorer

- Accreditation Plan
 - Title Page
 - Purpose
 - Background
 - M&S Intended Use
 - Acceptability Criteria
 - M&S Description
 - M&S History
 - M&S Development
 - M&S Variables
 - M&S Inputs/Outputs
 - Configuration Manag
 - Accreditation Resources
 - Accreditation Issues

M&S Inputs/Outputs

Describe the required M&S inputs and expected outputs.

Print Preview

Close

Page

Accreditation Plan - M&S Inputs/Outputs

Accreditation Plan

1. Accreditation Resources

1.1. Accreditation Funding

1.1.1. Funding Sources

1.1.2. Funding Allocation

1.1.3. Funding Justification

1.1.4. Funding Monitoring

1.1.5. Funding Reporting

1.1.6. Funding Accountability

1.1.7. Funding Transparency

1.1.8. Funding Integrity

1.1.9. Funding Efficiency

1.1.10. Funding Effectiveness

1.1.11. Funding Sustainability

1.1.12. Funding Resilience

1.1.13. Funding Adaptability

1.1.14. Funding Innovation

1.1.15. Funding Collaboration

1.1.16. Funding Partnership

1.1.17. Funding Alliance

1.1.18. Funding Consortium

1.1.19. Funding Network

1.1.20. Funding Ecosystem

1.1.21. Funding Community

1.1.22. Funding Stakeholder

1.1.23. Funding Interest

1.1.24. Funding Influence

1.1.25. Funding Power

1.1.26. Funding Authority

1.1.27. Funding Legitimacy

1.1.28. Funding Credibility

1.1.29. Funding Reputability

1.1.30. Funding Reliability

1.1.31. Funding Consistency

1.1.32. Funding Predictability

1.1.33. Funding Stability

1.1.34. Funding Security

1.1.35. Funding Soundness

1.1.36. Funding Viability

1.1.37. Funding Feasibility

1.1.38. Funding Practicality

1.1.39. Funding Possibility

1.1.40. Funding Probability

1.1.41. Funding Potential

1.1.42. Funding Promise

1.1.43. Funding Hope

1.1.44. Funding Optimism

1.1.45. Funding Positivity

1.1.46. Funding Enthusiasm

1.1.47. Funding Excitement

1.1.48. Funding Anticipation

1.1.49. Funding Expectation

1.1.50. Funding Desire

1.1.51. Funding Want

1.1.52. Funding Need

1.1.53. Funding Requirement

1.1.54. Funding Demand

1.1.55. Funding Supply

1.1.56. Funding Availability

1.1.57. Funding Accessibility

1.1.58. Funding Usability

1.1.59. Funding Convenience

1.1.60. Funding Simplicity

1.1.61. Funding Ease

1.1.62. Funding Quickness

1.1.63. Funding Speed

1.1.64. Funding Timeliness

1.1.65. Funding Promptness

1.1.66. Funding Immediate

1.1.67. Funding Instant

1.1.68. Funding Real-time

1.1.69. Funding Live

1.1.70. Funding On-demand

1.1.71. Funding On-call

1.1.72. Funding On-site

1.1.73. Funding On-line

1.1.74. Funding On-air

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1.1.98. Funding On-air

1.1.99. Funding On-screen

1.1.100. Funding On-board



- Change XML data from one format to another (for example, Navy Standards to DoD where joint simulations are present).
- Facilitates “Composability” by creating a standardized Metadata language for V&V. VVML gives the capability to select and assemble components to satisfy specific user requirements meaningfully.



VVML: Benefits



- Parts of documents can be formatted to allow programs to locate information inside the documents
- For example, charts, graphs and embedded objects can be updated within the documents by updating source data.
- Apply or change data display information (for example, summarize key information on an Excel spreadsheet for Flag Officers or other decision makers without tinkering around hiding or locking the original data cells).



VVML: Integration with the VDT



- Requirements traceability functions are made possible with the underlying XML.
- VVML will make it possible for one document to contain multiple forms of data.

Here is a picture of a circle.

Here is the mathematical equation for a circle.

$x^2 + y^2 = 1$

A circle can be described graphically, such as:

`` or I may need to describe a circle mathematically by using MathML

The ability to embed other XML languages, schemas or DTD's is this simple example of describing a circle

```
<html xmlns="http://www.w3.org/TR/xhtml1/strict"
xmlns:mathml="http://www.w3.org/1998/Math/MathML"
xmlns:svg="http://www.w3.org/Graphics/SVG/SVG-19991203.dtd">
  <head>
    <title>A Circle</title>
  </head>
  <body>
    <p>Here is a picture of a circle.</p>
    <svg:svg width="300" height="300">
      <svg:ellipse style="stroke:#000000; stroke-width:3;
stroke-opacity:1; fill:#000000; fill-opacity:0" cx="150" cy="150"
rx="144" ry="144" />
    </svg:svg>
    <p>Here is the mathematical equation for a circle.</p>
    <mathml:math>
      <mathml:reln>
        <mathml:eq/>
        <mathml:apply>
          <mathml:plus/>
          <mathml:apply>
            <mathml:power/>
            <mathml:ci>x</mathml:ci>
            <mathml:cn>2</mathml:cn>
          </mathml:apply>
          <mathml:apply>
            <mathml:power/>
            <mathml:ci>y</mathml:ci>
            <mathml:cn>2</mathml:cn>
          </mathml:apply>
        </mathml:reln>
      </mathml:math>
    </body>
</html>
```



The VDT and VVML



- The VV&A Doc Tool is the front-end to the VVML, as such no one needs to learn or manually create a VVML file.
- The complexity of VVML is hidden by the windows-like VV&A Doc Tool



Demo

